RFRX1702

17.7GHz TO 19.7GHz GaAs MMIC IQ DOWNCONVERTER

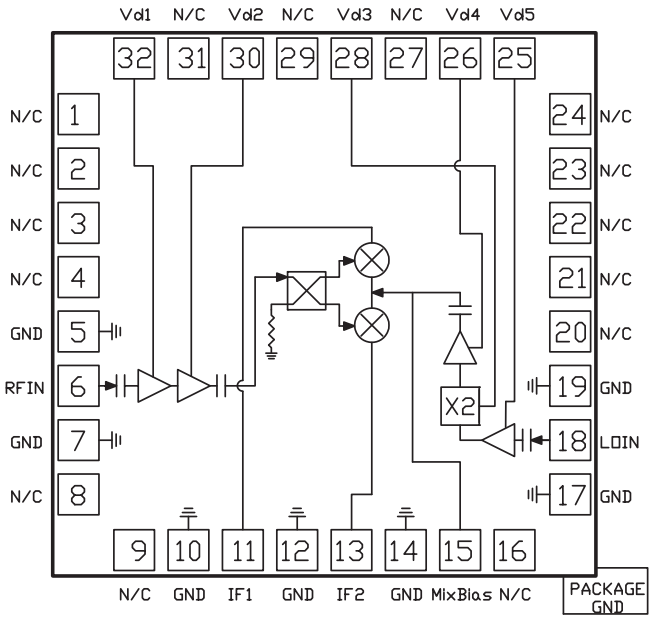
Package: QFN, 32-Pin, 5mm x 5mm x 0.95mm

Features

- RF Frequency = 17.7GHz to 19.7GHz
- LO Frequency = 6.85GHz to 11.85GHz
- IF Frequency = DC to 4GHz
- Conversion Gain = 12dB
- Noise Figure = 2dB
- IIP3 = 6dBm
- Image Rejection = 15dB
- Low Cost 5mm x 5mm QFN Package

Applications

- Point-Point Radio
- Point-Multipoint Radio
- Satellite Communications
- Radar
- Electronic Warfare



Functional Block Diagram

Product Description

The RFRX1702 is a 17.7GHz to 19.7GHz GaAs pHEMT downconverter, incorporating a low-noise amplifier, an integrated X2 LO frequency multiplier and buffer amplifier, and an image rejection mixer. The combination of high performance part and low cost packaging makes the RFRX1702 a cost effective solution, ideally suited to both current and next generation Point-to-Point Microwave Radio and Satellite Applications. RFRX1702 is packaged in a 5mm x 5mm QFN to simplify both system level board design and volume assembly.

Ordering Information

RFRX1702S2	2-piece sample bag
RFRX1702SB	5-piece bag
RFRX1702SQ	25-piece bag
RFRX1702SR	100 pieces
RFRX1702TR7	750 pieces on a 7” reel
RFRX1702PCBA-410	Evaluation Board

Optimum Technology Matching® Applied

☐ GaAs HBT	☐ SiGe BiCMOS	☑ GaAs pHEMT	☐ GaN HEMT
☐ GaAs MESFET	☐ Si BiCMOS	☐ Si CMOS	☐ BiFET HBT
☐ InGaP HBT	☐ SiGe HBT	☐ Si BJT	☐ LDMOS

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Absolute Maximum Ratings

Parameter	Rating	Unit
LNA Drain Voltage	6	V
LOA Drain Voltage	6	V
RF Input Power	10	dBm
LO Input Power	15	dBm
T_{OPER}	-40 to +85	°C
T_{STOR}	-65 to +150	°C
ESD Human Body Model	Class 1A	

Caution! ESD sensitive device.

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

RFMD Green: RoHS compliant per EU Directive 2002/95/EC, halogen free per IEC 61249-2-21, < 1000ppm each of antimony trioxide in polymeric materials and red phosphorus as a flame retardant, and <2% antimony in solder.

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Overall					
RF Frequency	17.7		19.7	GHz	
LO Frequency	6.85		11.85	GHz	
IF Frequency	DC		4.0	GHz	
LO Input Drive		+5		dBm	
Conversion Gain		13		dB	
NF (17.7GHz to 19.7GHz)		2		dB	
IIP3		6		dBm	
Image Rejection		15		dB	
LO to RF Isolation		40		dB	
LO to IF Isolation		15		dB	
LO Return Loss		12		dB	
RF Return Loss		12		dB	
V_D		2.8 to 4.5		V	
I_D		350		mA	

NOTES: Measurements performed on part soldered on evaluation board with SMA connectors and IF ports connected to an external 90° Hybrid Combiner and LO Power of +5dBm and at 25°C, unless otherwise stated.

IF = 2.5GHz, RF Power = -20dBm, IIP3 is measured with a 2-tone input of -23dBm power for each tone and Δf = 10MHz, Vd1 = 2.8V, Vd2 = 4V, Vd3 through Vd5 =4.5V, MixerBias = 0V

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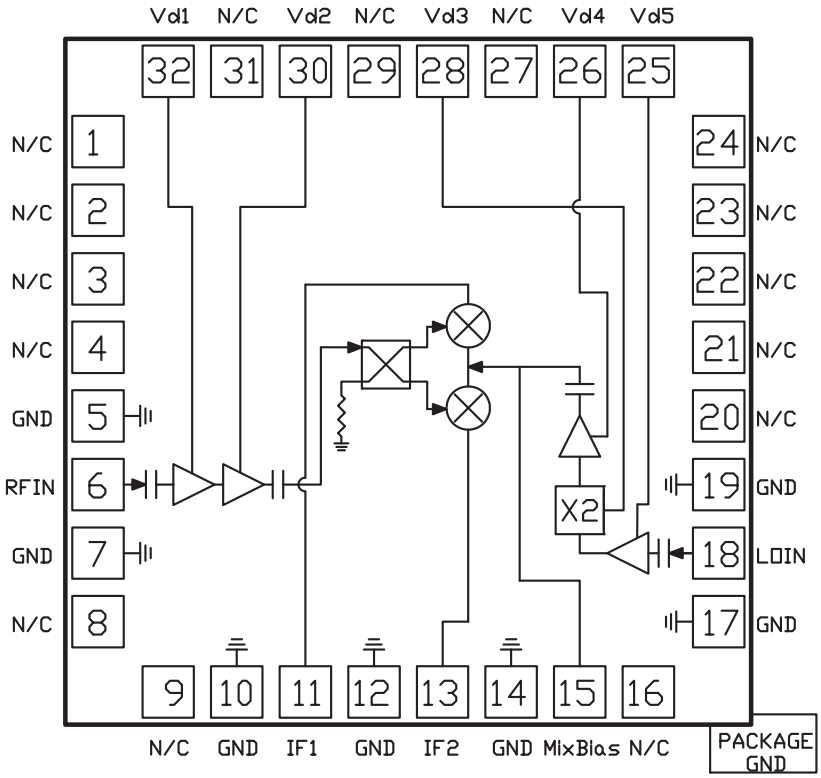
Pin Names and Description

Pin	Function	Description
1	N/C	Not Connected
2	N/C	Not Connected
3	N/C	Not Connected
4	N/C	Not Connected
5	GND	GND
6	RF	RF Input, AC coupled and matched to 50Ω
7	GND	GND
8	N/C	Not Connected
9	N/C	Not Connected
10	GND	GND
11	IF1	IF1 Output
12	GND	GND
13	IF2	IF2 Output
14	GND	GND
15	Mixer Bias	Mixer Bias = 0V
16	N/C	Not Connected
17	GND	GND
18	LO	LO Input, AC coupled and matched to 50Ω
19	GND	GND
20	N/C	Not Connected
21	N/C	Not Connected
22	N/C	Not Connected
23	N/C	Not Connected
24	N/C	Not Connected
25	Vd5	Vd5 (LOA bias) = 4.5V
26	Vd4	Vd4 (LOA bias) = 4.5V
27	N/C	Not Connected
28	Vd3	Vd3 (LOA bias) = 4.5V
29	N/C	Not Connected
30	Vd2	LNA drain bias2 = 4V
31	N/C	Not Connected
32	Vd1	LNA drain bias1 = 2.8V

Pin Out



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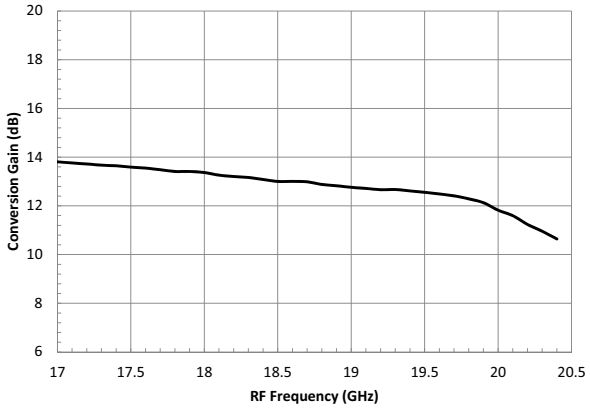
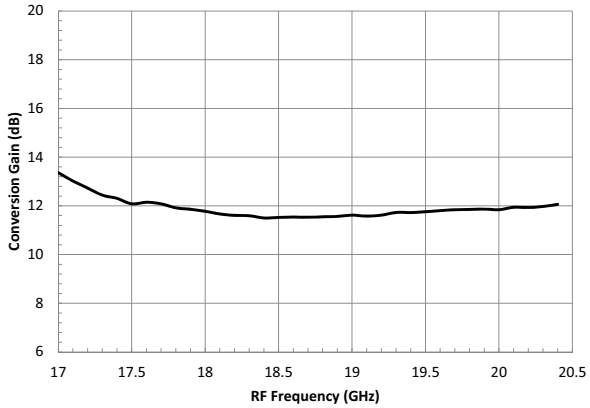
Typical Electrical Performance

Measurements performed on part soldered on evaluation board with SMA connectors and IF ports connected to an external 90° Hybrid Combiner and LO Power of +5dBm and at 25°C, unless otherwise stated.
IF = 2.5GHz, RF Power = -20dBm, IIP3 is measured with a 2-tone input of -23dBm power for each tone and Δf = 10MHz, Vd1 = 2.8V, Vd2 = 4V, Vd3 through Vd5 = 4.5V, MixerBias = 0V.

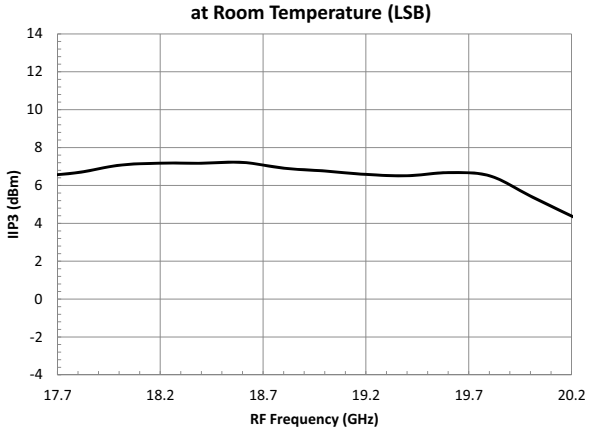
Conversion Gain versus RF Frequency at Room Temperature (LSB)



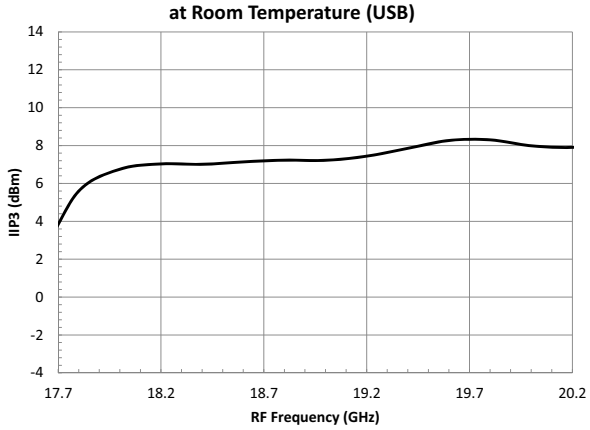
Conversion Gain versus RF Frequency at Room Temperature (USB)



IIP3 versus RF Frequency at Room Temperature (LSB)

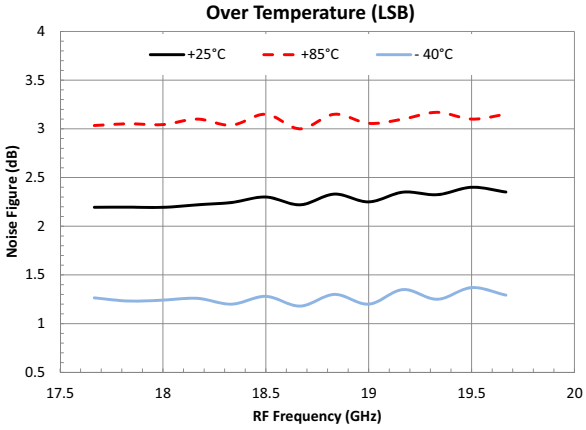


IIP3 versus RF Frequency at Room Temperature (USB)



Typical Electrical Performance (continued)

Noise Figure versus RF Frequency
Over Temperature (LSB)



Noise Figure versus RF Frequency
Over Temperature (USB)

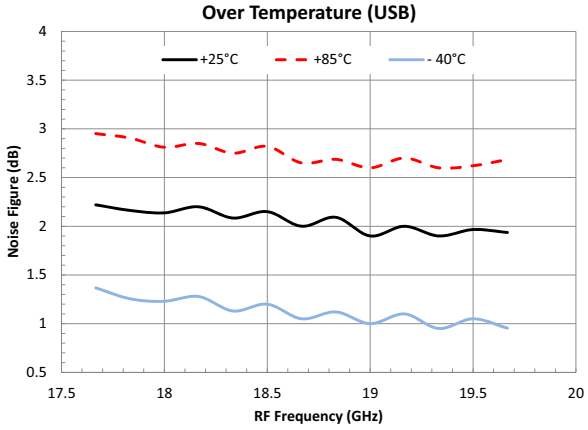


Image Rejection versus RF Frequency
at Room Temperature (LSB)

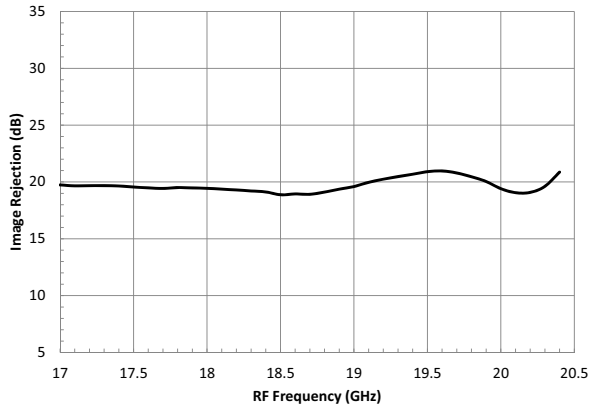
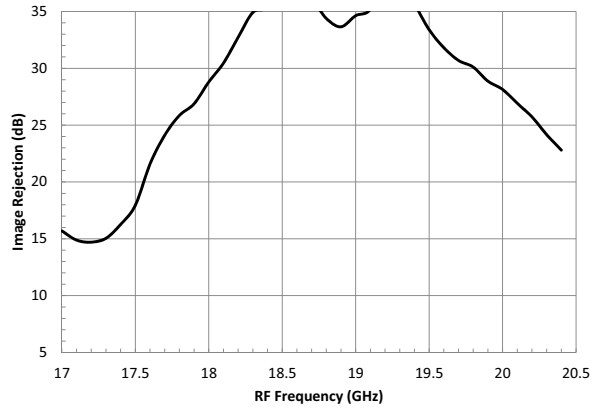
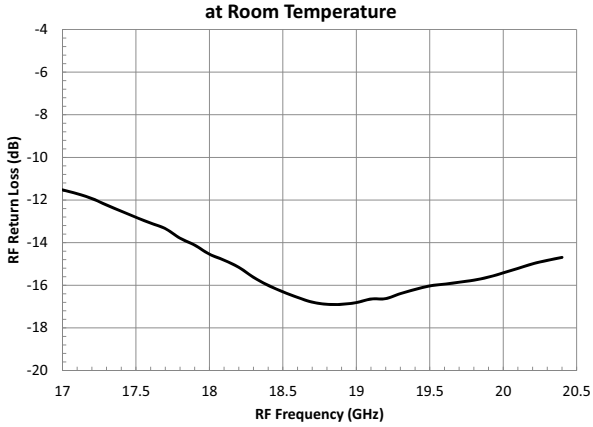


Image Rejection versus RF Frequency
at Room Temperature (USB)



RF Return Loss versus Frequency
at Room Temperature



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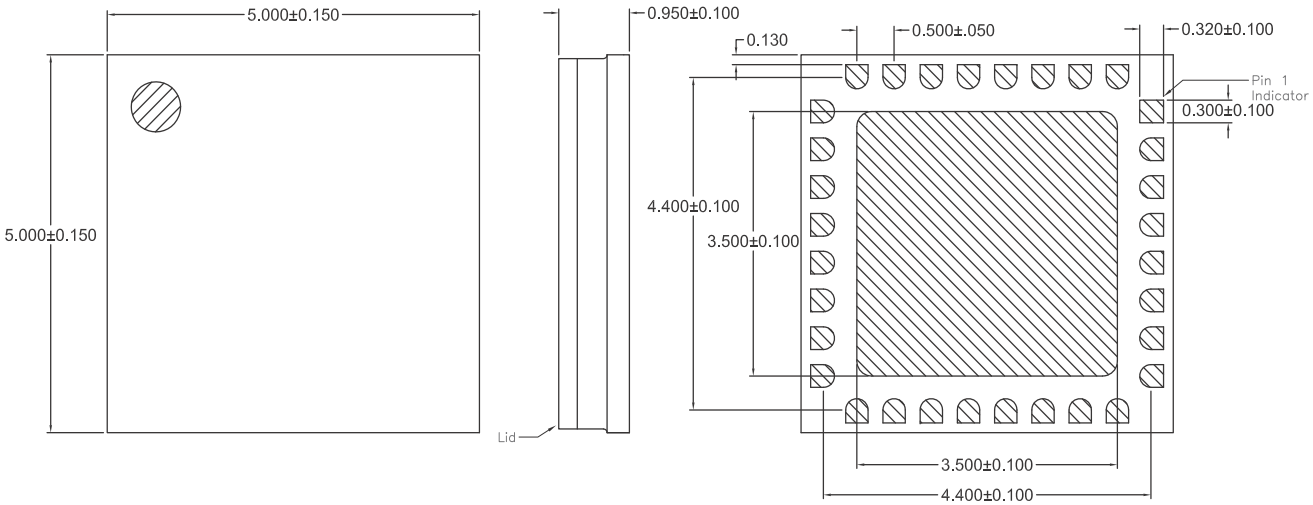
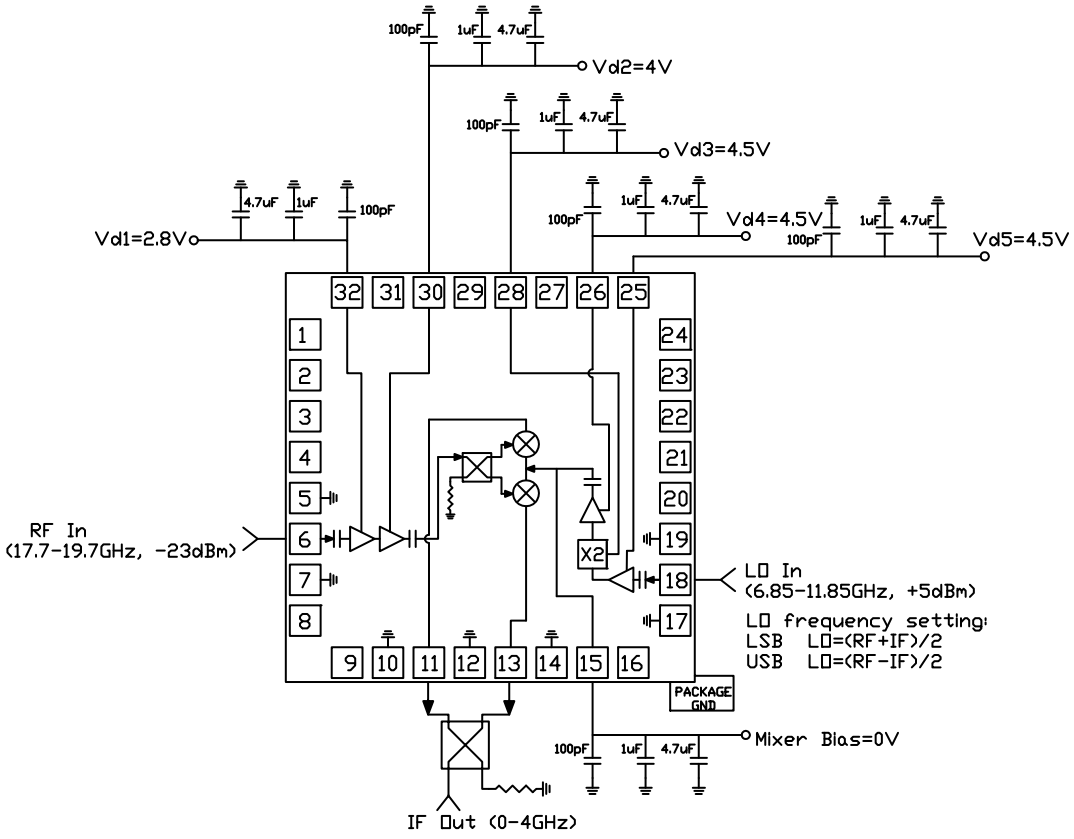
Package Outline Drawing

(QFN, 32-Pin, 5mm x 5mm x 0.95mm)



Application Circuit Block Diagram



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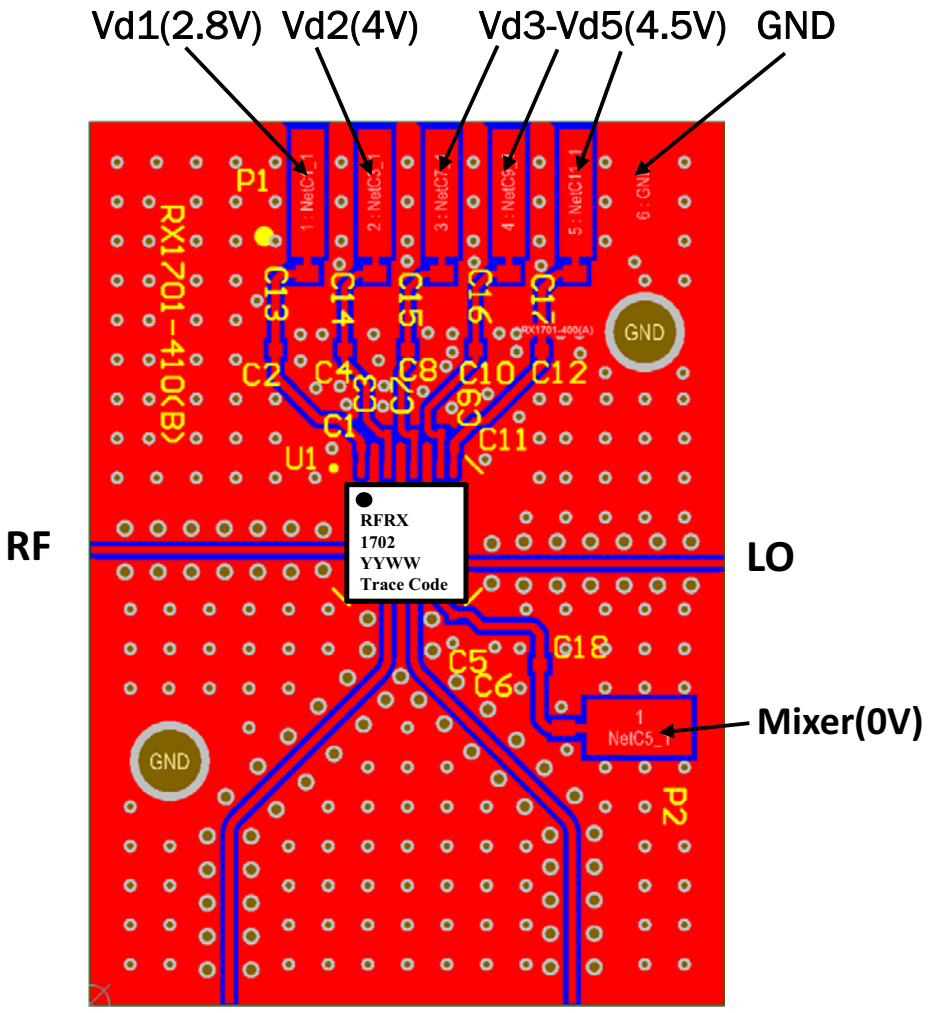
Evaluation Board



IF1 IF2

C1=C3=C5=C7=C9=C11=100pF

C2=C4=C6=C8=C10=C12=1μF

C13=C14=C15=C16=C17=C18=4.7μF

Test Condition

LO Power	+5dBm
RF Power	-20dBm
Vd1	2.8V
Vd2	4.0V
Vd3, Vd4, Vd5	4.5V
Mixer Bias	0V

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